



Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with A++ Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

Continuous Internal Assessment –II April 2025

II Semester

Class : I PG
Branch : Chemistry

Time : 2 hours
Max. Marks : 60

23MCHC09 Physical Chemistry II

- CO1: Understanding of kinetics and mechanistic aspects of chemical reactions
CO2: Understanding of kinetics and mechanistic aspects of fast reactions
CO3: Ability to distinguish the various adsorption isotherms
CO4: Identify the steps involved in studying a system quantum mechanically
CO5: Generalize the HMO treatment of simple and conjugated n electron systems

Part-A

Answer the following

6×1=6

1. A catalyst
a. actually participates in the reaction
b. changes equilibrium concentration of products
c. does not affect the reaction energy path
d. always decreases the rate of the reaction
CO2K2
2. When the rate of the reaction is equal to the rate constant, the reaction is
a. first order
b. zero order
c. second order
d. third order
CO2K3
3. Heat of adsorption is defined as the energy liberated when ----- of a gas is adsorbed on the solid surface.
a. 1 molecule
b. 1 gram
c. 1 gm mole
d. 1 kg
CO3K1
4. In a 1D box normalization factor is
a. $2/a$
b. $\sqrt{2}/a$
c. a/b
d. a/d
CO5K2
5. For $n=0$, the hermite polynomial is
a. Infinite
b. 1
c. 2η
d. 4η
CO5K3
6. According to Born $|\varphi|^2$ represents the
a. wavelength
b. probability density
c. frequency
d. wave number
CO4K1

Part-B

3x6=18

Answer all Questions

Each answer should not exceed 200 words or one page

7. a. Illustrate primary salt effect
(or)
b. Explain the stop flow method to determine the rate of fast reactions
CO2K3
8. a. Discuss on BET adsorption isotherm
(or)
b. Discuss the degeneracy in 3 D rectangular box
CO5K4
9. a. Enumerate on LCAO approach for overlap of 2 atomic orbitals
(or)
b. Deduce the secular equation for Ethylene and Butadiene
CO5K3

Part – C

3x12=36

Answer ALL Questions

Each answer should not exceed 600 words or three pages

10. a. Discuss the kinetics of acid – base catalysis
(or)
b. Discuss the effect of ionic strength on the kinetics of ion – ion reactions in solution
CO2K3
11. a. Derive the Schrodinger equation for a SHO system
(or)
b. Derive the Schrodinger equation for a rigid rotor system
CO5K4
12. a. Give a detailed account of Variation method of approximation
(or)
b. Derive the Schrodinger equation for hydrogen atom
CO5K5